REMARKS

Claims 1-11 are currently pending in the application. No claims are currently being amended. The foregoing separate sheets marked as "Listing of Claims" shows all the claims in the application, with an indication of the current status of each .

Claim Rejections: 35 USC § 103(a)

Claims 1-11 stand rejected under 35 USC § 103(a) as unpatentable over Wargon (US 2004/0153283) in view of Arnarson et al. (US 5,184,733, hereinafter "Arnarson"). This rejection is traversed.

The present invention provides an apparatus and method for determining the weight of an object without using a scale. The weight can then be used to calculate the price of the object. Instead of using a scale, the invention uses one or more images generated by a camera to 1) visually identify a product by type (i.e. to answer the question "What is this?"); and 2) determine the volume of the product. The volume is used to calculate the weight of the product by referring to a table of known product densities, and the price can then be calculated as a function of the price/weight ratio. This process is faster than the usual practice of requiring a check-out person to memorize or look up the code of items that do not have a bar cod.

Clearly, photographic images provided by a camera are central to the present invention. Surprisingly, however, the Examiner has chosen Wargon as the primary 103(a) reference even though the apparatus of Wargon does not comprise a camera. In the first place, Examiner has incorrectly described the Wargon apparatus. Examiner states that Wargon's is an apparatus to determine "prices and products priced by weight". However, Wargon specifically and repeatedly describes the apparatus as one which displays the weight and cost of ***segments* of an irregularly shaped item** (see, for example, the first sentence of Abstract, and the preambles of independent claims 1 and 87). Importantly, no product identification/determination is involved. The problem purportedly solved by Wargon is how to estimate the weight and cost of a small segment of a large, irregularly shaped item (e.g. a fish or a large piece of meat) before separating (e.g. cutting) the small segment from the large item. This could be helpful, for example, in accommodating a customer's request to provide a specific cut of meat or fish without exceeding a certain price, which is difficult to judge "by eye". In order to solve this problem, Wargon developed an

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elaborate movable sensor bar that includes a linear array of sensors mounted along the underside. The sensors (which may be mechanical, acoustical, optical, etc.) generate electronic signals corresponding to the cross sectional contour of an item lying beneath the bar (see paragraph 0101) as the bar is moved over the surface of the item. In addition, one of the uprights which attach the bar to the flat surface on which it is mounted contains a displacement detector (e.g. a Moiré fringe detector, although other types can be used, see paragraph 0102). The cross sectional contour data is used in combination with the displacement data to calculate, using a signal processor such as a computer into which density settings have been entered, the volumes of various selected segments of the large item. Based on a calculated volume of such a "virtual" segment, the price of a cut segment can be calculated (or at least closely estimated) prior to actually slicing and weighing the portion that is cut away. Some embodiments of the invention also incorporate a cutting blade to implement a calculated cut.

In contrast, the camera-implemented method of the present invention is used to determine the identity of the item that is photographed (see line 2 of claim 1, and line 4 of claim 7), and to calculate its volume. This is accomplished by comparing the image taken by the camera(s) to a database of images (page 5, lines 9-11). Logically, this is necessary to fulfill the purpose for which the present invention is intended, because the relationship between volume and density varies amongst types of produce of the same volume, e.g. a potato would likely be more dense than an orange of the same volume. Significantly, in the method of Wargon, the identity of the "large item" is already known to the user of the sensor. The large item is directly in front of the user and the sensor is used as a guide to determine how the large item should or could be divided. But the identity of the item is not and need not be determined by the sensor, and Wargon does not describe such a need or a method of doing so, and does not provide or use an image database for such a determination.

There is no place in the invention of Wargon for a camera. Including a camera would be pointless and would not contribute in any way to the information that is being obtained, or to solving the problem addressed by Wargon. A photograph would be entirely superfluous, would add extra expense and time to the method, and the information obtained would be useless. What exactly would be photographed and why? Applicant notes that, in contrast to the present

invention, the invention of Wargon is not a time-saving device. Rather, Wargon's method would add significant analysis time prior to readying a product for purchase, the trade-off being that the final product (the small segment of the larger item) would more closely resemble what a customer or sensor user has in mind before actual processing of the large item takes place.

Interestingly, Examiner has inexplicably identified only two aspects of principal reference Wargon as relevant to the present invention: a database of lookup tables of product densities, and a computer terminal to receive product type and volume information, and to calculate weight and price. (Applicant notes that product type is not determined by the inventive method but is known to the user.) To use Wargon as a primary reference, Examiner appears to have extirpated the central inventive concept of Wargon: the use of a cross sectional contour sensor coupled with a displacement detector to calculate the volume of individual, theoretical segments of a larger item. Examiner has picked out incidental features of Wargon while ignoring the actual invention, which does not, would not and could not reasonably include a camera, and is designed to solve a different problem than that which is solved by the present invention.

Nevertheless, Examiner purports to supply the teaching of a camera by combining Wargon with Arnarson. This combination is untenable.

Firstly, Arnarson does not teach only "a camera" but rather an apparatus comprising, and in fact, requiring: 1) a camera positioned above and aimed at a surface of a conveyor belt, and 2) a mirror positioned along side and parallel to the conveyor belt (see claims 1 and 8). According to Arnarson, an object on the conveyor belt moves past the camera, and a direct (top) image of the object is obtained by the camera whilst a profile image of the object is also reflected into a lens of the camera by the mirror (see column 2, lines 26-33). The direct (i.e. top view) image and the profile (i.e. side view) images are together used to determine the volume, form and/or weight of the object, and the use of both a camera and a mirror is required by Arnarson (see claims 1, 8 and 14). In fact, in a preferred embodiment of Arnarson, a line scan camera is employed (see first sentence of Abstract, sentence at lines 26-28 of column 2, and claims 2, 9 and 15), consecutive measurements are made, and the final volume is obtained by adding multiple sectional volumes (column 3, lines 13-14). Applicant notes that in Arnarson, the camera must be positioned above a conveyor belt and the object that is analyzed must be moving along the belt (see column 2, lines

27-28, and method claim 8 at lines 60 and 62 of column 4 at, where the object is described as "traveling below the camera"). In contrast, the present invention has no such requirement. The requirement for the present invention is merely that an object to be analyzed is placed "in the field of view of the camera". A conveyor is not necessary, and manual placement of the object suffices (page 4, lines 7-9), implying that the object is not necessarily moving.

Applicant further notes that while Arnarson requires both a top and side image of the object in all cases, the present invention does not necessarily require both. Lines 3-4 of page 4 state that "Where the product is generally symmetrical (e.g. oranges and other produce), a single camera is all that is required...", i.e. a single image is used to identify and "weigh" the object. When non-symmetrical objects are analyzed, one or more additional cameras (not mirrors) may be added or a stereoscopic camera may be used (page 4, lines 5-6).

In addition, Arnarson states that "Data of the recorded image is then transmitted to microprocessor 9 which analyzes the images and determines the weight, volume, and form of the object." (Column 2, lines 43-46). Applicant notes that the object is not "identified by type" as is required in claims 1 and 7 of the present invention. As is the case with Wargon, Anarson assumes that the user knows the identity of the object that is scanned and does not provide an image database for product identification. Instead, Anarson describes a "β" or "form factor" (column 3, lines 1-4), the components of which are the type of object, the orientation of the object and the estimated size of the object, all of which are supplied by the user. In contrast, the present invention is designed to include a step of type identification and the claims require a step of type identification.

Again, it appears that the Examiner has selectively focused on only one component of the apparatus taught by Arnarson, eschewing other essential features and components (camera aimed at conveyor belt, side mirror, etc.). Examiner has in effect dismantled the inventive apparatus and precluded its intended use in order to cite a "camera".

In summary, the teachings of Wargon and Anarson cannot reasonably be combined. Such a hypothetical combination would involve both scanning a moving object of known identity with a sensor and redundantly photographing the moving object of known identity using a camera and mirror (or vice versa) to determine the volume and hence the weight and/or price, without ever

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determining the identity of the object. Applicant respectfully submits that this so-called "combination" is completely untenable, and does not result in the present invention.

In contrast, the present invention provides a method to calculate the weight of an object within a camera's field of view by identifying the type and volume of the object. This is accomplished using a database of object images and tables which correlate volume, density and weight for that particular object type.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of this rejection.
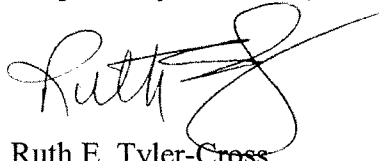
Concluding Remarks

In view of the foregoing, it is requested that the application be reconsidered, that claims 1-11 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at 703-787-9400 (fax: 703-787-7557; email: ruth@wcc-ip.com) to discuss any other changes deemed necessary in a telephonic or personal interview.

If an extension of time is required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to International Business Machines Deposit Account No. 50-0510.

Respectfully submitted,

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